

REMARKS

Claims 1-23 are pending. Claims 18-22 have been withdrawn from consideration as being directed to non-elected inventions. Reconsideration in view of the following remarks is respectfully requested.

Claim Rejection – 35 USC § 103

The Examiner rejected claims 1-3, 5-10, 14, and 17 under 35 U.S.C. § 103(a) as being unpatentable over Tanabe (US Patent No. 5,476,736) in view of Kim et al. (US Patent No. 5,821,034).

Claim 1 recites, *inter-alia*, “performing a first exposure to image a first pattern; performing a second exposure to image a second pattern, wherein at least one of said first and second exposures is performed using an illumination mode having a substantially dipolar intensity distribution.” This enables, among other things, lithography to be performed with reduced feature size and/or improved processing parameters such as, for example, exposure latitude, mask error factor, depth of focus and proximity effects, without having to use improved optics and/or diffraction-assisted masks.

The Examiner admits that Tanabe does not disclose that at least one of the first and second exposures are in dipolar illumination mode.

Furthermore, Tanabe merely discloses carrying out first and second projections of a beam of light onto a photoresist film through the same mask at two different positions of the photoresist along the optical axis of the projection system. In other words, Tanabe projects a beam of light (darkened in certain regions) to a photoresist film through a mask (first projection) and subsequently projects a beam of light to the photoresist film through the same mask (second exposure). Thus, Tanabe uses the same mask and images the whole pattern, i.e. a same pattern, in the mask during the first and second exposures. Consequently, Tanabe does not disclose, teach or suggest performing a first exposure to image a first pattern and performing a second exposure to image a second pattern.

Kim et al. simply projects a micro-pattern using a dipole illumination oriented in a first direction (X-axis) and projects the same micro-pattern using a dipole illumination oriented in a second direction (Y-axis). In fact, Kim et al. states that projecting a micro-pattern using a dipole illumination in X-axis and then projecting the micro-pattern using a dipole illumination in Y-axis allows obtaining the same effect as in the case of two sheets of masks (see col. 4, lines 20-30 in Kim et al.). Thus, according to Kim et al., only one mask,

i.e., one pattern, is required resulting in a reduction of mask-manufacturing costs.

Consequently, Kim et al. does not disclose, teach or suggest performing a first exposure to image a first pattern and performing a second exposure to image a second pattern.

Furthermore, there is no suggestion in either Tanabe or Kim et al. to perform a first exposure to image a first pattern and perform a second exposure to image a second pattern. Tanabe and Kim et al. both use the same mask, i.e., the same pattern, to perform the first projection and second projection.

Therefore, for at least the above reasons, Applicants respectfully submit that claim 1 and claims 2, 3, 5-10, 14 and 17 which are directly or indirectly dependent from claim 1, are patentable and respectfully request that the rejection of claims 1-3, 5-10, 14 and 17 under § 103(a) be withdrawn.

Claim Rejection – 35 USC § 103

The Examiner rejected claims 4 and 23 under 35 U.S.C. § 103(a) as being unpatentable over Tanabe (US Patent No. 5,476,736) in view of Kim et al. (US Patent No. 5,821,034) and further in view of Neisser (US patent No. 5,563,012).

Claims 4 and 23 are indirectly dependent from claim 1. Therefore, for at least the reasons presented above in claim 1, Tanabe and Kim et al. do not disclose, teach or suggest, alone or in combination, the subject matter recited in claims 4 and 23. Neisser fails to overcome the deficiencies noted above in Tanabe and Kim et al. Specifically, Neisser fails to disclose, teach or suggest anything about a substantially dipolar illumination and fails to disclose, teach or suggest performing a first exposure to image a first pattern and performing a second exposure to image a second pattern. Consequently, Tanabe, Kim et al. and Neisser do not disclose, teach or suggest, alone or in combination, the subject matter recited in claims 4 and 23.

Therefore, Applicants respectfully submit that claims 4 and 23 are patentable and respectfully request that the rejection of claims 4 and 23 under § 103(a) be withdrawn.

The Examiner rejected claims 11-13 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Tanabe in view of Kim et al. and further in view of Nishi (US Patent Application Publication No. 2002/0109827 A1).

Claims 11-13 are directly or indirectly dependent from claim 1. Therefore, for at least the reasons presented above in claim 1, Tanabe and Kim et al. do not disclose, teach or

suggest the subject matter recited in claims 11-13. Furthermore, as conceded by the Examiner, Tanabe and Kim et al. do not disclose, teach or suggest at least one of the exposures is performed using polarized electromagnetic radiation. Moreover, Nishi fails to overcome the deficiencies noted above in Tanabe and Kim et al. Specifically, contrary to the Examiner's contention, Nishi fails to disclose, teach or suggest anything about a substantially dipolar illumination or dipolar intensity distribution. Consequently, Tanabe, Kim et al. and Nishi, do not disclose, teach or suggest, alone or in combination, the subject matter recited in claims 11-13.

Therefore, Applicants respectfully submit that claims 11-13 are patentable and respectfully request that the rejection of claims 11-13 under § 103(a) be withdrawn.

The Examiner rejected claims 15-16 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Tanabe in view of Kim et al. and further in view of Maeda et al. (US Patent No. 6,263,099). Applicants respectfully traverse this rejection for at least the following reason.

Claims 15 and 16 are directly or indirectly dependent from claim 1. Therefore, for at least the reasons presented above in claim 1, Tanabe and Kim et al. do not disclose, teach or suggest the subject matter recited in claims 15 and 16. Moreover, Maeda et al. fails to overcome the deficiencies noted above in Tanabe and Kim et al. Consequently, Tanabe, Kim et al. and Maeda et al. do not disclose, teach or suggest, alone or in combination, the subject matter recited in claims 15 and 16.

Therefore, Applicants respectfully submit that claims 15 and 16 are patentable and respectfully request that the rejection of claims 15 and 16 under § 103(a) be withdrawn.

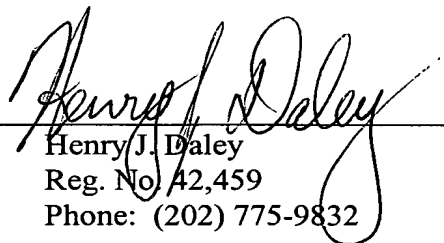
CONCLUSION

In view of the foregoing, the claims are now in form for allowance, and such action is hereby solicited. If any point remains in issue which the Examiner feels may be best resolved through a personal or telephone interview, he is kindly requested to contact the undersigned at the telephone number listed below.

All objections and rejections having been addressed, it is respectfully submitted that the present application is in a condition for allowance and a Notice to that effect is earnestly solicited.

Respectfully submitted,

PILLSBURY WINTHROP LLP

By: 
Henry J. Daley
Reg. No. 42,459
Phone: (202) 775-9832

HJD/KG

00909
P.O. BOX 10500
McLean, VA 22102
(703) 905-2000